

Systems Engineering Conference

Program Managers Panel

Trident II

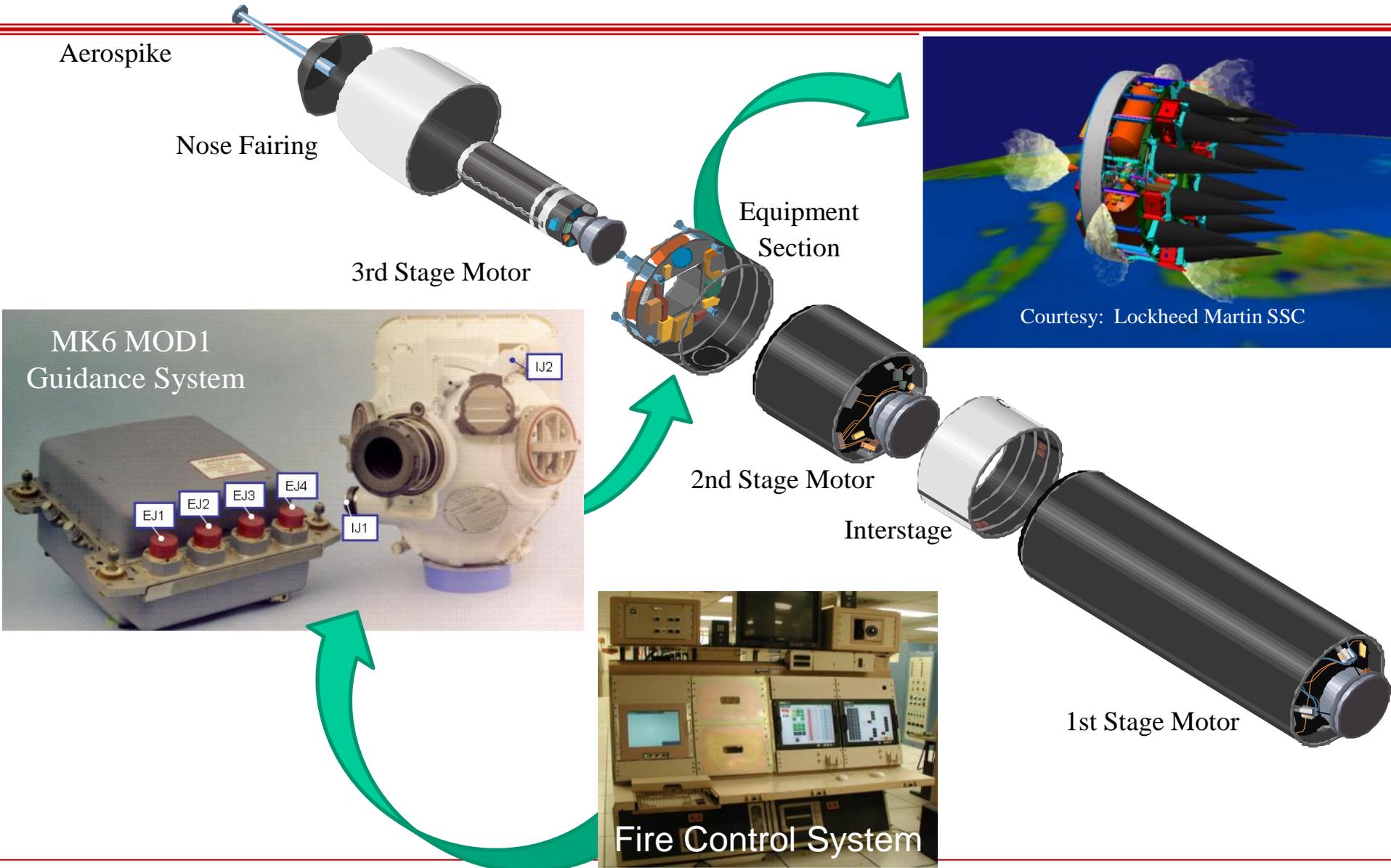
MK 6 MOD 1 Guidance System

Brenan McCarragher

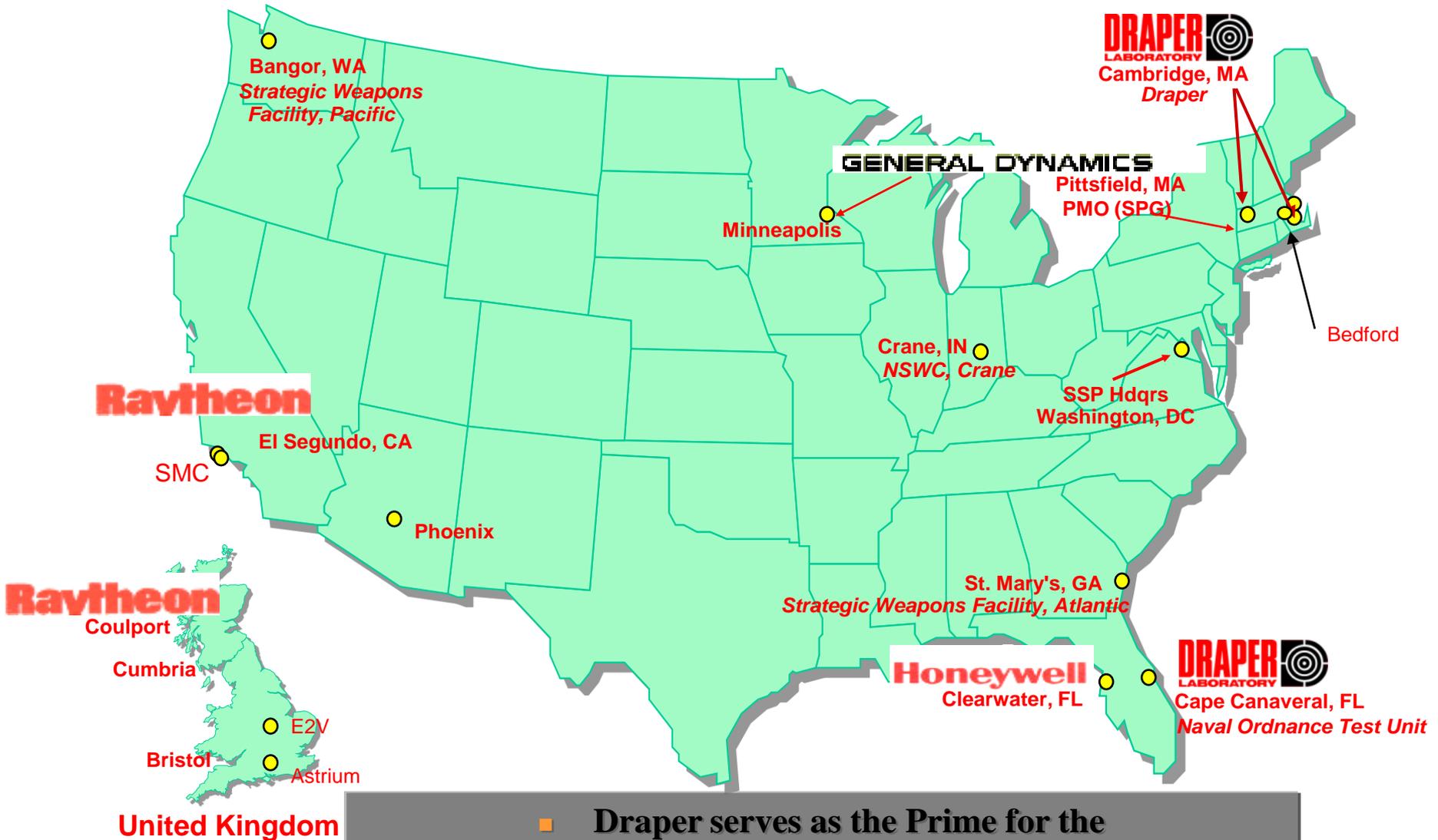
Draper Laboratory

October 2012

MK 6 MOD 1 Guidance in Context



The Strategic Guidance Team



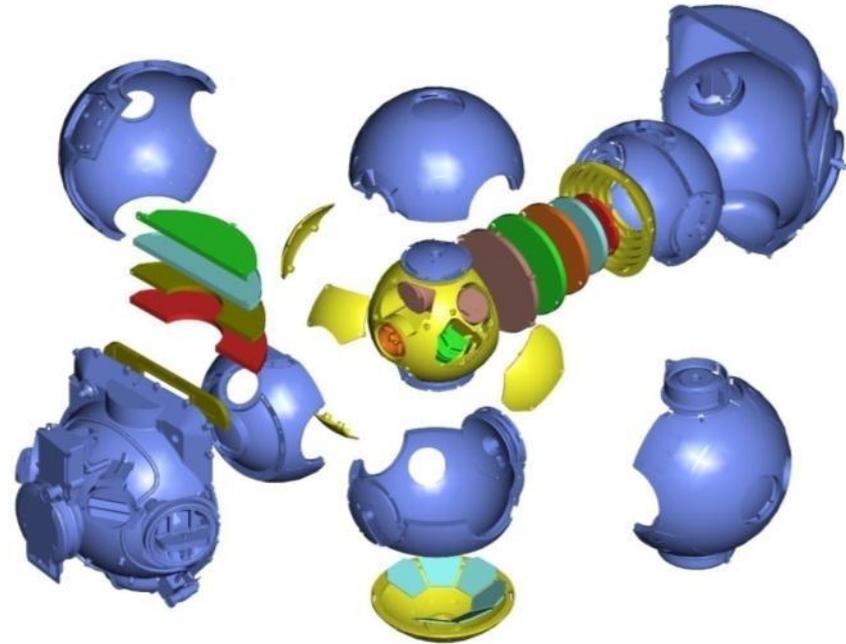
■ Draper serves as the Prime for the Trident Guidance Program (MK 6 MOD 0 and MOD 1)



Key Systems Engineering Decisions

- **Modular Architecture addressing Life Cycle Costs**

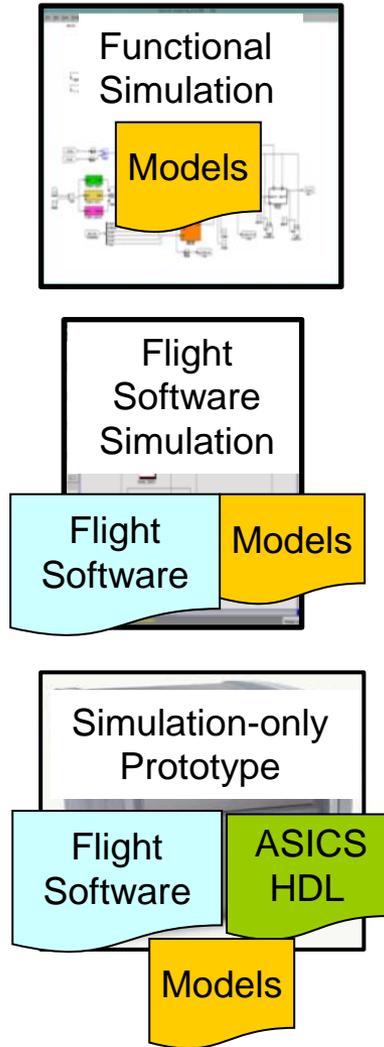
- Parallel path development, integration, test and production
- Delayed technology decisions until proven readiness
- Enabled mission flexibility (Alternate Mission Interface; System Expansion)



■ Attitude SS	■ Mission SS	■ Velocity SS
■ Comm/Timing SS	■ Platform Control SS	■ REUSE
■ Electromechanical SS	■ Power SS	(Electromechanical)
■ I/O SS	■ Stellar SS	

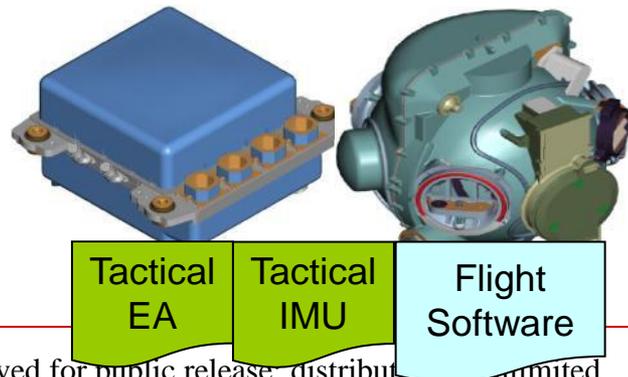
Modeling and Simulation Based Design

Computer-only Simulation

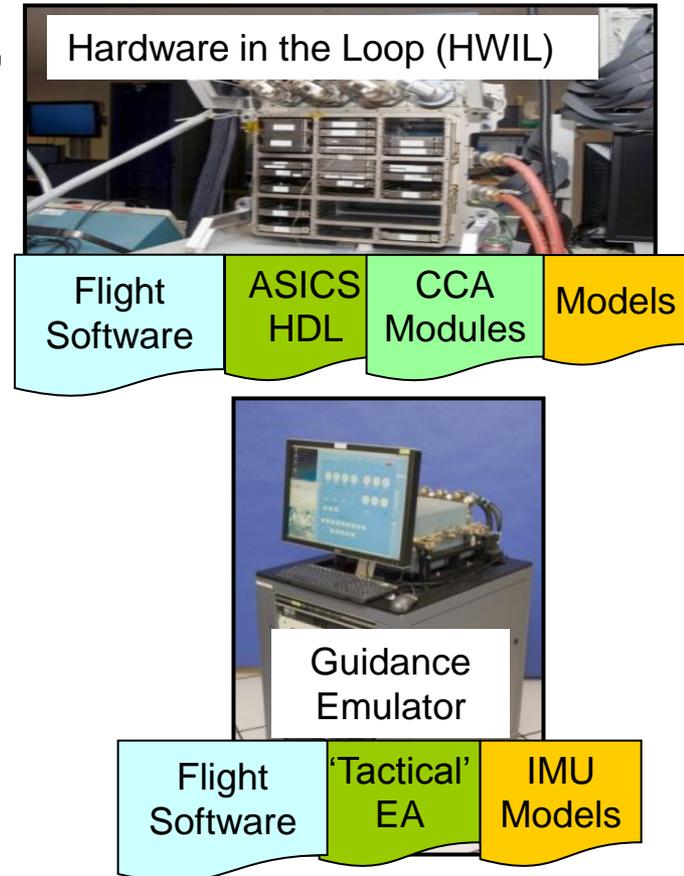


- **Modeling and Simulation supported the requirements, concept design, detail design, integration and production phases of the program**
- **Key driver for parallel integration and reduced need for assets**

Tactical Guidance System



Hardware / Software Simulation



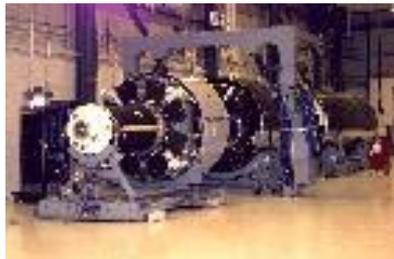
Enhanced Ground Testing (EGT)

Dynamic Shaker

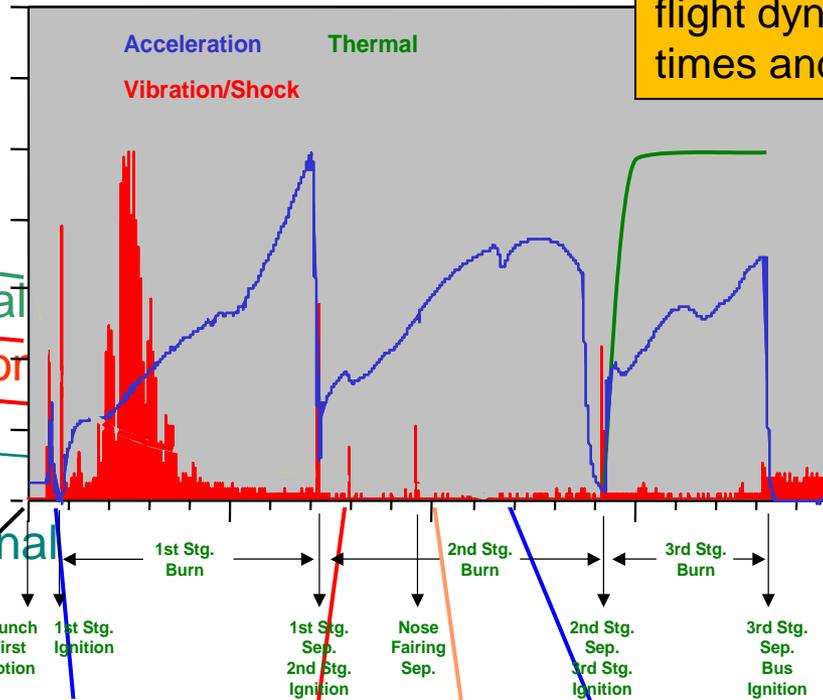


Thermal
Vibration
Shock
Stellar
Functional

Electrical
Interfaces



Test Profiles replicate flight dynamics, event times and event durations



Precision Centrifuge



Acceleration
(Accuracy only)

Launch Pulse
Angular Rate
Vibration
Acceleration

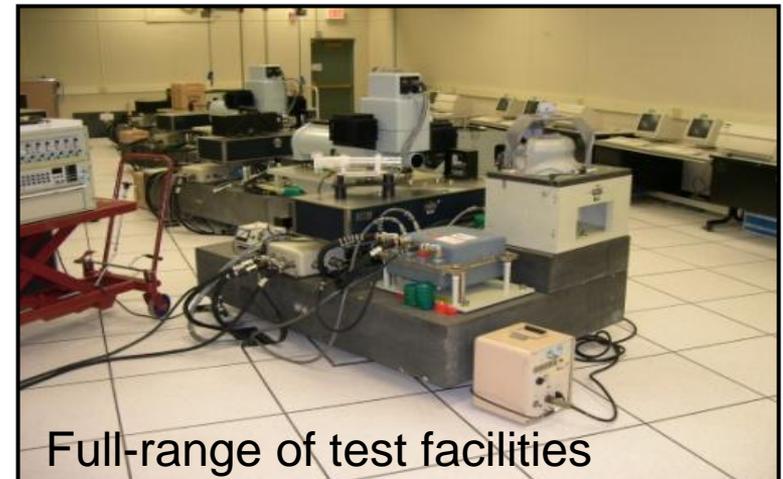
Aircraft POD



Test Program is defined to match missile dynamics

Embedded Production

- Consolidated Integrated Support Facility for system assembly, test, repair
- Embedded production engineers in the design, integration and test teams
- Embedded integration and test engineers into the production facility



SE Processes Needing Improvement

- **Need more agile Independent Software V&V**
 - Significant Schedule
 - Significant Cost
- **Efficient Risk Management**
 - Better definition of classification of risks
 - More representative costing of risk realization